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RESULTS TO BE EXPECTED FROM A SCHOOL COURSE IN GEOGRAPHY

BY RALPH S. TARR

Professor of Dynamical Geology and Physical Geography, Cornell University, Ithaca, N. Y.

AS a result of geography study in the grades, a child should have gained a fair knowledge of the geography of his home region. That is, he should know something of its physiography, industries and life conditions, and the relations, if notable, between these. I know of a city, in the schools of which a study is made of the delta of the Mississippi, while no use is made of the delta on which the schools are situated. An opportunity is missed here, and I suspect similar opportunities are missed in many other places.

The child should have a general understanding of the relations between his home region and the great world—what the home region contributes to the world and what the world contributes to it, and why. He should know of some regions resembling his own in other parts of the world, and some that differ from it, with reasons.

No child should be allowed to escape from geography without knowing the shape of the earth and the relations of its parts. I do not mean that he should merely learn that "the earth is round like a ball or an orange," but that he should be master of a globe. In how many schools does use keep the dust off the globe? How common is it for children to know what part of South America is due south of New York City? Or whether Spain is nearer Cuba or Newfoundland? Or whether it would be nearer to send grain from Winnepeg via the St. Lawrence or Hudson Bay? Or what is the relative distance from London, New York and New Orleans to Cape St. Roque?

The direction of places from his own home should be clearly understood, and this could easily be taught by having children point toward places

as they are learning about them. I know of the case of a man, a college professor, who while studying geography sat at a desk which caused him to face the West. With the map having its northern edge toward the West, he learned directions just 90° out of the way, and to this day, when thinking of directions he has first to apply the correction of the 90° error which during his youth became so grounded in his mind.

The child should have a comprehensive knowledge of his own country, its main physical features, its climate, its life conditions, its leading industries, and such relations between these as can be clearly shown to children.

The names and locations of the states and leading cities, the child should know and should not be allowed to forget until after finishing the study of geography in the schools. This knowledge should be so clearly defined in the child's mind that he could sketch a map of the country, the state boundaries, and the location of the leading cities from memory—not a finished drawing with all the crooks of the state boundaries, but a general sketch map.

I believe the child should have the same kind of knowledge regarding other countries or continents, knowing the main physical features, the climate, the leading industries, and the relations between these. In addition he should know something about the people—their characteristics, and mode of life, especially with relation to its resemblance to or difference from our own.

It should be possible for each child to draw an outline map of each of the continents, and to sketch in the boundaries of the countries, and locate the leading cities. He should know something about these cities besides their mere location, and if there is a relation of importance between location and the surroundings, this relation should be known. In a continent sketch the main seas, gulfs, peninsulas and islands should be named.

There is such a close relation between climate and industry that a child should appreciate the main facts regarding world climate, and understand its influence on industries and people; and this knowledge should be made specific by application in instances where the influence is clear and unmistakable.

Children should be so taught that geography becomes instructive and even fascinating, thus leading them to further study after school days are over. As it is now far too many pupils go through geography as a hateful grind, giving up thanks when it is ended. One way to accomplish the end of making geography attractive is to show its relation to other things, such as history, travel, newspaper reading, etc. Let the child see that geography knowledge is related to life work and teach him some of the relations.

There are doubtless other facts and relations which a child could well

be expected to carry away from a rational and well-conducted course in geography, but these that I have mentioned I believe to be the most fundamentally important. They will equip a child for later education along geographic lines, an education that in most instances comes from reading and travel. Geography education merely begins in the schools, and it is important to make the beginning a good one and sufficiently attractive to add zest to further education.

There are some things which I think a child should *not* carry away from a study of geography, and if I were to make a list of them I should place first in the list the little tidbits served up in some of the supplementary readers of the "dear little children" class. Life is too short, and school life ought to be too serious for that sort of thing. It would be better to revert to the old-fashioned method of learning all the capes and all the capitals, for that at least trains the memory.

Besides supplying a stock of information, geography study ought to train the child's mind, and lead him to adopt certain mental habits. In this training, that of memorizing should have a conspicuous place. It has become a habit, in some quarters amounting even to a fad, to consider the mere training of the memory of little educational value. I suspect that this is in imitation of the university where reasoning and individual thinking have higher rank than mere memorizing; but university students need first of all to have a memory, and training toward this end must come early in life. I believe that no mental quality, aside from qualities of morality, is of more fundamental importance than that of memory, and no mind is better equipped than that with strong memory combined with good reasoning power. Geography properly taught provides opportunity for training both the memory and the reasoning power; and it should in all cases be made to contribute toward thus equipping the scholar. The old-fashioned teacher who required the learning of lists of names was not altogether wrong, and the new-fashioned teacher may well imitate his old-fashioned teacher to some extent.

One result of geography study should be the acquisition of the habit of inquiry. Where is this place? Why is this thing so? What is there in that section? And coupled with the habit of inquiry should be an unwillingness to accept explanations that are not clear and convincing. Rid the pupil of the belief in the infallibility of books and teachers and encourage him to think for himself, if only a very little.

Another result of geography study should be the learning of the *atlas habit*. To know how to use an atlas and to know that, in its way, the using of an atlas is as valuable as using a dictionary, is to learn a lesson of great value in preparation for life work. It is true that many of the scholars may

grow up without need or opportunity for the use of an atlas; but many others will have the opportunity and, if acquainted with the value of the atlas, will find the need of using it. They should have the lesson.

In a similar way geography study offers opportunity to learn how to make use of other books, including the encyclopedias; but the mistake should not be made of teaching the scholars that they are "going to first sources," as I have heard very good teachers call this sort of "research."

The use of the text book in geography, and of reference books should also teach the use of an index. How often have I seen college students looking for something in a book by turning over page after page, when by turning to the index the topic could be found in a minute. It is the business of the schools to teach scholars how to avoid such wastes of time.

These are some of the direct and indirect effects of geography study which I should expect a child to carry away from a well-taught course in geography in the grades. I know of schools where all these results, and more, are obtained; but I know of far more schools where only a meager fraction of them is attained. It would be a great boon to geography teaching if there could be a general agreement upon the question, "What should the child gain from his geography course?" and some uniformity of agreement as to the best means of teaching the subject so as to insure his gaining it.

RUSSIA COMPARED WITH AMERICA

Russia is two and one-half times as large as the United States and Alaska, but America has fifty-three times as many miles of telegraph and sends fifteen times as much mail.

Russia stands next to the United States as a grain producing country, but the average laborer there gets only one-fourth as much wages as in the United States.

The United States has twenty-three times as many factories as Russia.

Russia produces one-twentieth as much coal and one-sixth as much iron as is produced in the United States.

In Russia there are only ninety daily newspapers; in the United States there are 2,457.

Russia has 30,000 miles of coast line, but half of it is ice-bound.

The United States has 210,000 miles of railways; Russia has only 36,000 miles of railways, two-thirds of it owned by the government.

Russia's population in 1903 was 141,000,000; population of the United States, 80,000,000.—*American Education, March, 1905.*

RESULTS TO BE EXPECTED FROM A SCHOOL COURSE IN GEOGRAPHY

BY R. H. WHITBECK
New Jersey State Model School, Trenton

THIS is the age of the enriched grammar school curriculum. Geography shares the boy's time with one or two dozen other studies. Serious study of the subject begins in the fourth or fifth school year, and ends in the seventh or eighth. There is a difference between the ideal—or what we should like to have the boy know of geography—and the attainable ideal—or what we may reasonably expect him to know. There is, too, quite a margin between what a boy may be expected to know at the end of the grammar school course and the sum of all that he has known, at one time and another, during that course. Of all the details he has learned in daily lessons he retains, perhaps, one-fifth throughout the eighth year. I suspect that even this fraction is too large. Nor is it unfortunate that he has forgotten so much. The value of much that he learned lies in having learned it, not in knowing it for all time.

Again, acquiring information is only a part, though a goodly part, of the aim in studying geography. This study coöperates with the others in building up mind-power, broadening interests, and cultivating judgment. Of all the studies in the elementary curriculum, geography most readily lends itself to the cultivation of cause-and-effect judgments. The "causal notion" may be carried too far in geography; we may call upon the pupil to reason more maturely than his youthfulness permits; yet, by almost daily observation of grammar school classes at work, I am convinced of the splendid field that geography offers for cultivating the power to reason from cause to consequence.

For convenience of treatment, I have divided the discussion that follows under six heads:

Home Geography.
The World as a Whole.
Knowledge of Location.
Facts of Physical Geography.
Facts of Commercial Geography.
General Facts.

Home Geography.—This information will not all be acquired in the early years of geography study. It will be gained little by little throughout the whole course.

The boy should acquire a first-hand knowledge of the surface features of the home region; of the natural products of the region; of the chief lines of manufacture in his own city or town.

He should gain something of an appreciation of how the different lines of manufacturing are influenced by the natural productions of the region; by the nearness of markets that demand certain articles; by the presence of water power, or the nearness of fuel supplies; by facilities for transportation, and how all these are influenced by physiography.

He should know whence local manufacturers obtain their raw materials; where they sell most of their out-put; and something of the reasons why the materials are bought and the goods sold where they are bought or sold; what advantages of situation his city possesses for carrying on special or general manufacturing; and what other cities are its chief competitors.

He should understand the reasons which lead to the exchange of commodities between the city and the country, between his city and other parts of the country, and between his country and other lands.

He should see the need of stores, wholesale and retail, of banks, of paved streets, of city government (if he lives in a city), of good roads leading through the country, of railroads, steamship lines, telegraph and telephone lines. In short he should acquire a considerable first-hand knowledge which will lead to an appreciation of the simpler causes that influenced the development of his own city in industries and commerce.

Home geography should be largely observational geography, from which, under the teacher's guidance, deductions are made and generalizations reached. The wisely conducted field trip is the richest geography lesson in the world. We have only begun to appreciate the value of this sort of geography. Says Karl Ritter: "Wherever home is, there lie all the materials which are needed for the study of the entire Globe."

Probably the geography of one's own state may not properly be termed home geography. Yet, just as a close study of one's city as a type gives an apperceptive basis for interpreting much that follows in geography, so the close study of one's own state in the light of "cause and consequence" makes far more real the general principles that the boy ought to know.[1]

The World as a Whole.—The boy ought to know with accuracy the meaning of the terms that are frequently used in geography: latitude, longitude, equator, axis, horizon, orbit, etc.; isthmus, peninsula, plateau, strait, etc.

He ought to know (in round numbers) the earth's dimensions; the amount of the inclination of its axis, and the effect of this in fixing the width

[1] The details of such a study as this were given in the October Journal of Geography.

of the light zones, in causing the change of the seasons, in causing variations in length of day and night.

He should know why the slanting rays of the sun heat the earth less than the direct rays and how this affects climate, and thus affects the conditions of life all over the earth.

He should know the causes for the length of our day, our month, and our year; the relation of longitude to time; the time belts in the United States.

He ought to know the relative sizes of the grand divisions of land, their grouping, the oceans and their larger arms that border each of the continents.

He ought to know something of the distances, both in time units and space units between, say, Liverpool and New York, San Francisco and Japan, San Francisco and New York by the Cape Horn route, the Panama route, and the overland route.

He ought to have some idea of the *relative* areas and populations of the leading nations of the world (their colonies not included); for example, he should know how Germany compares with France, the British Isles, Russia, and the United States in area and population.

He ought to have a reasonably correct notion of distances in the United States, and of the relative sizes and populations of typical states, using his own state as a unit of comparison.

He should know the simpler facts about atmospheric movements and their causes and results; about trade winds, calms, prevailing westerlies, and especially how these affect climate, navigation, and ocean currents.

He ought to know the simpler facts about oceanic movements; the three or four most pronounced "currents"; their relation to the prevailing winds and their climatic influence. The nature and periodicity of the tides, their connection with the moon, and their effect on navigation should be known. A thorough discussion of the causes of the tides is out of place in elementary geography.

He ought to have a reasonably correct notion of the latitude of important foreign countries and cities as compared with parts of the United States: to know, for example, that St. Petersburg has the same latitude as Southern Greenland. Such inquiries will lead to a knowledge of oceanic and continental climates, and the difference in climate between east-facing and west-facing coasts.

Knowledge of Location.—Given an unlettered map of the United States, on which the states are outlined, our grammar school graduate ought to be able to write the names of the states in their proper places. He ought to

be able to do as much for the important divisions of South America, Europe, Asia, and Africa.

He should know the approximate location of the eight or ten best known rivers of the Atlantic Slope of North America; the six or eight main rivers of the Mississippi system; three or four of the Pacific Slope rivers, and two or three of Canada; the three great river systems of South America; four or five of Africa, a half dozen of Asia, two or three of the British Isles, of France, of Germany, and of Russia; also the Po and the Danube. He should, of course, know the rivers of the region in which he lives.

He should know the location of such arms of the ocean as are highways of the world's great commercial movements.

He should know the location of those islands and groups of islands that are real factors in the world's activities, or have a general historical interest.

He should know the facts of position, direction of trend, etc., of the half dozen most important mountain systems or mountain groups of North America; the Andes, Alps, Pyrenees, Apennines, Caucasus, Ural, Himalaya and Altai; the location of a few of the most frequently mentioned peaks; such, for example, as Mt. Blanc and Mt. Everest.

There are a few capes that are often mentioned, such as Horn, and Good Hope, and their location is worth knowing.

He ought to know something of the location of the *chief* colonies of Great Britain, France, Germany, Holland, and the United States.

He ought to know accurately the location of some twenty-five of the chief cities of the United States; what those cities stand for in our industrial and commercial life, and the advantages of their situation. There are twenty-five or thirty foreign cities whose location should be definitely known, and also something of what those cities stand for. In addition to these, there are fifty or more other cities at home and abroad whose names ought to be familiar to the pupil. It is sufficient to know merely in what state or nation these are located.

Facts of Physical Geography.—Émile should know why the rocks decay, how soil is made, how the agents of waste work, how streams carve their valleys, and make flood plains and deltas, and carry waste to the sea.

He should know the characteristics of old valleys, and of young valleys, and the influence of each upon human affairs.

He should know why there are lakes and waterfalls in stream courses, and the effect of these upon human well-being.

He should know in a simple way how the earth's crust is made, how it has wrinkled into mountain folds and valleys, how the strong rocks have

resisted the agents of waste, and the weak rocks have yielded—the former standing up as highlands, and the latter being reduced to valleys.

He should understand that rising and sinking of the land is going on, and that along the coast this results either in a sandy plain bordered by a shallow sea, or in a coast with drowned river mouths and good harbors.

He should have some knowledge of such topics as underground water and caverns, of geysers, volcanoes, earthquakes, and glaciers. If he lives in a glaciated region, he should know how the glacier removed and deposited soil, transported boulders, scoured out valleys, ponded streams into lakes, caused waterfalls, and made terminal and ground moraines.

He should understand the chief factors that determine the climate of a region, with emphasis upon the climate of his home. Systematic weather observations ought to be made and their meaning interpreted.

He should know the meaning and significance of isotherms, and the difference between heat zones and light zones.

In his study of the facts of physical geography, he should have considered constantly their relation to human affairs.

Facts of Commercial Geography.—Many of the fundamental principles of commercial geography may be studied at first hand in the home city and surrounding region. Reference is made to some of these under "Home Geography."

Our boy should know, in considerable detail, a few of the great lines of industry in the United States. These should be treated on the plan of Dr. McMurry's Type Studies. Such studies might be:

(*a*) Flour—from the sowing of the wheat to the delivery of the flour to the consumer.

(*b*) Steel—from the Lake Superior iron mines to finished steels rails.

(*c*) Beef—from ranch to retail market.

(*d*) Cotton—from plantation to loom.

He should know the main geographical condition or conditions that favor the production of the world's great staples of commerce: tea, coffee, sugar, grains, silk, spices, cotton, fruits, wool, etc. Climate and soil conditions are, of course, the leading factors.

He should know something of the distribution of the richest mineral regions of the world, and the influence of these deposits upon the industrial development of the countries where they are found. Such, for example, are the gold and diamonds of South Africa; the gold of Australia, California, and the Klondike; the iron and coal of Germany, the British Isles, and different sections of our own country.

He should know our four or five chief imports from South and Central

America, one, two or three each from the chief countries of Europe, from Mexico, Canada, West Indies, East Indies, Japan, China, and a few other countries. Beware of long lists of imports and exports.

He should know the nature of our trade with Great Britain, Germany, and France; why, as a rule, food products are going in one direction, and manufactures in the other.

He should have gained, by frequent repetition, an appreciation of the importance of transportation lines; of access to great markets, to fuel, and to raw materials; and the value of good harbors and navigable inland waters.

He should know by what railroad lines he would probably travel in going from his home to a few of the great cities of the country.

He should know the four or five chief seaports of Europe that have regular and frequent steamer connection with New York and Philadelphia.

General Facts.—While details about government and religion are out of place in geography, yet the pupil should know under what forms of government and religion the leading nations or races live.

He should know the capitals of the important nations. I do not believe he need learn the capitals of all of our states.

He ought to have studied enough field geography to have an intelligent interest in recognizing the geographical features that he sees in a railway journey.

He ought to have acquired an interest in world's peoples, places, and happenings, that will qualify him to enjoy reading about them after he leaves school.

He should have studied maps, and sketched maps, to the end that, when reading about any part of the world, he can picture the map of that country in his mind.

He should have acquired, little by little, an elementary realization of the meaning of "geographic control" and "geographic response," and some knowledge of the relation of geography to history. He should have learned the use of atlas, encyclopedia, and other standard reference books.

THE SCHOOL OF GEOGRAPHY AT THE UNIVERSITY OF OXFORD

The report for 1904 of the School of Geography at the University of Oxford, shows that the school is growing rapidly in strength and efficiency. The average attendance for the three terms was 133, including one student each from the United States, France, Germany, Italy and Egypt. The larger part of the work was devoted to the History of Geography and to Regional Geography.

RESULTS TO BE EXPECTED FROM A SCHOOL COURSE IN GEOGRAPHY

BY MARTHA KRUG GENTHE
Hartford, Conn.

"I do not see how we can avoid the conclusion that if efficiency in teaching can be determined at all it must be determined by the results achieved."—*J. M. Rice.*

THE merits of the teaching of geography, as well as of any other branch of teaching, must be judged by their results. The results of all teaching may be summed up under the two questions: How much knowledge has the child derived therefrom? and: How much mental power has it given him? Both power and knowledge contribute to produce independence of thought. A teacher who gives his pupils only knowledge, however accurate it may be, will fail to make them mentally independent, because they will not know how to use it. A teacher who trains only the reasoning power of the child without equipping him with a liberal supply of positive information, will also fail in this respect, because the child will depend on others for the material on which to apply his finely developed intellect. This is especially true of a science so full of positive facts as geography. Setting aside, therefore, these aspects of the teaching which work toward creating power, and taking the general necessity of its acquisition for granted, it seems well worth while to take up a separate discussion of what a child ought to *know* in geography at the end of his school course.

Geography is earth-lore; but such are, in a different sense, geology, and botany, and zoology, and physics, and chemistry—each one of the natural sciences tells a chapter of the story of our planet. Geography deals with that chapter of earth-lore which tells what important part the problem of location has played in this story which unveils both the causes and the consequences of location. If, for reasons of convenience, the store of geographical information is divided into a physico-geographical and a bio-geographical half, this ought not to lead to a method of teaching which fills one corner of the child's memory with physiographic, and another with "ontographic," facts. *Geography is that part of earth lore which explains the causes and consequences of location.* What is located together in nature, must not be located separately in the mind. Therefore, as far as the question of positive knowledge is concerned, the child who has completed a good course in public school geography must associate every name which it has learned in the course with a fairly definite place on the map and with a general knowledge of the main features of that place which constitute its environment.

Such an association requires:

1. An elementary knowledge of mathematical geography. Longitude and latitude remain at the bottom of every geographical problem. Their explanation requires a knowledge of the shape, size, and motions of the earth, and through these of climatic and atmospheric conditions as well as of the main features of the sky: pole star, zodiac, and as a little refreshing supplement, the acquaintance with the principal stars and planets: the earth itself being one of those places whose location and environment ought to be fairly well known.

2. The knowledge of the shape, size, and relative position of the continents and oceans. It is the distribution of these large units of geography which has indicated the primary lines for the distribution of man, animal, and plant. The late entrance of South America, South Africa, and Australia on the stage of the world's history as compared with Asia, Europe, and North America can never be better understood than in view of the waste of waters toward which their tapering outlines point and which renders communication, that powerful stimulus of development, practically impossible under primitive conditions. One of the greatest faults of current school maps is that they deprive the children, out of misplaced economy, of the picture of the region south of the 30th parallel. "There is nothing there" is the excuse. On the contrary, this very Nothing is what we need on the maps, the bleak, bare nothing of the southern cap of the earth which has in all ages been the barrier of progress, and whose inhospitable realm even nineteenth century enterprise has not conquered.

3. The knowledge of the main topographic features of the continents and of the currents of the oceans as developers, or retarders, of progress. Why is Russia the only European country whose size approaches that of the United States? Why, however, is not a single Russian river, whether in Europe or in Asia, equal to the Mississippi, or even the Hudson, in commercial value? The location of the topographic features explains such problems.

4. An acquaintance with the countries of the earth as geographical units. Even among the states of this country, whose boundaries are to a great extent artificial and devoid of any geographic foundation, we have come to discern groups of states which compose natural units. To a much larger extent do the natural and the political groups correspond in the countries of the old world where during the slow development of earlier ages the natural barriers of man's expansion were almost insurmountable and where therefore the political territories had to adapt themselves more or less closely to the geographical conditions. The story of the old countries in

Asia, Europe, and Africa, is the story of rivers, mountains, and valleys. Their original boundaries were not laid by the official surveyor; they have a history just as much as the river has one, and the whole geography of the old world and partially even that of the new, can be demonstrated by the story of how man took possession of the soil. Therefore a deeper understanding of the present geographic conditions of the old countries cannot be secured without some knowledge of the fundamental phases of their development, and for this reason a short abstract of their history ought to be required as an essential part of the geography of the more important countries of the world.

Taking Germany, for example, the first problem of location, the ascertaining of latitude and longitude, would be found in the numbers 48-56 N. and 6-23 E. What does that mean? First, that it lies in the temperate zone, *e. g.*, in the zone which has given birth to the most civilized and progressive nations; secondly, that it lies on the eastern hemisphere, viz.: belongs to the old countries. This means that its institutions are superior to other countries in regard to stability and maturity, and inferior in regard to elasticity, and adaptability to new conditions. It means a densely populated country, a strong and continuous emigration of the surplus population. It means traditions and legends, and crumbling towers. It means the product of all the civilizations combined which, from the days of Julius Caesar, have flourished on its soil.

The second problem is its location within the continent. We find Europe between 77 and 35 N. and 10 W. and 65 E. This means, first: that almost all countries of Europe are in the temperate zone, and that therefore Germany must always have met with the competition of other progressive and civilized countries; secondly, that this competition must have had a beneficial influence as a stimulant to its own progress: thirdly, that through its central position among such active neighbors, it is more likely to get into trouble, either by war or by commercial rivalry, than any other nation; fourthly, that only by constant watchfulness in war and peace can it hope to avoid being crushed between its competing neighbors.

The third problem would be its location with regard to the oceans and waterways. We find that it has no direct access to the ocean highways, and should expect it to hold no high rank among the seafaring nations. Yet we find large seaports, and the consular reports tell us that it is one of the leading nations in commerce and shipping. Why? Because it is an old country, viz.: its navigation was started at a time when ocean highways were no part of the world's trade routes, and by the time that transoceanic travel

developed, the spirit of enterprise, stimulated by competition and aided by an old civilization, found means to adapt itself to the changed conditions.

The fourth problem would be the location of its mountains. Where are the mountains, and where the plains, in Germany? We find the mountains mainly in the south, the level country mainly in the north. What is the consequence? A striking uniformity of the climate from north to south, the higher altitude of the latter being counterbalanced by its southerly location. We also find that the eastern parts of the country include more lowland than the western parts, and that they connect with the large Russian lowland. Consequence: the east is under the influence of the continental climate of Russia, while the west has the even climate of the Atlantic regions. Thus, the differences of climate in Germany are found between the east and west rather than between the north and south.

How is the distribution of the ranges within the mountainous area? Some trend NE.-SW., others SE.-NW. What is the consequence? A dissection of the country by the mountains into small provinces which, in an old country settled long before means of quick locomotion were available, lead to a splitting up of the nation into numerous small tribes under separate chiefs of which the present political map of Germany still bears striking evidence.

The fifth problem: location of the rivers. All the space in which the rivers can develop is included between the Alps and the ocean. Consequence: short rivers, each of them smaller than any of the important navigable rivers of America. We should expect almost no navigation. We find plenty of it. Why? Because the country is an old country, and therefore its navigation started at a time when only small craft and small distances entered into consideration. In proportion as trade grew, these limited possibilities were gradually developed to their utmost capacity, and by dredging, regulating, and deepening the channels even these wretched watercourses were made to satisfy the demands of a trade which much larger rivers in the new countries are unable to supply.

Sixth, the location of the cities: Where are, for instance, Hamburg, Bremen, and the other leading seaports situated? Not at the mouths of the respective rivers, as New York and other American ports, but several miles inland, viz.: at the head of the tide water line, so that large steamers cannot go up the shallow river and must be unloaded before reaching the city. Why? Because at the time when those ports were founded, rivers were the only ways of inland transportation, ocean vessels were smaller and therefore the harbor was built at the farthest inland point which vessels could reach, so as to shorten as far as possible the expense of land transportation.

In new countries where the development of commerce set in almost with the use of steam transportation, the slow waterway was shortened as much as possible, and the goods taken from the steamers as soon as they came within reach of the railroad.

These are only a few of the hundreds of possibilities which the scientific study of geographical location offers. They suffice to show how well the physical and the human aspects of geography can be blended so that the student gets a *complete* and *homogeneous* idea of the countries of the world and their share in its life and work. As far as the explanation of pure physical and geological subjects helps to explain the interdependence of the various problems, their knowledge must be demanded of the pupil; but on the whole, geography is neither physics nor geology, and both teachers and pupils ought to be spared a great amount of work whose proper place is not in the geography lesson, but in natural history. If it makes a pupil's impression of the Rhine valley more vivid to know that the rivers there dissect an old peneplain, well and good; but if it takes up the time which ought to be spent in making the pupil see that Berlin is not situated on the Rhine—an opinion quite frequent even among college students—he is missing some knowledge much more important for an understanding of Germany from the geographical point of view than the other fact can ever give him.

Under such treatment, map study, not book study, becomes the foundation of geography teaching; this adds a fundamental requirement to the knowledge derived from school geography: ability to read a map, from the simple relief map of the elementary course to the sheets of the state survey. If then, upon completion of the course, the pupil is able to find his way on the globe, directed by the knowledge of where the places are, influenced in his choice by a correct idea of their relative importance, and guided by the best productions of cartographic art, it may well be said that he knows all he ought to know in geography at the end of his school course.

MEMORIZING IN SCHOOL GEOGRAPHY

Do not have pupils memorize any boundaries of states or countries, except a few of importance. Pupils should, however, know from the formation of mental pictures the location of the states and countries.

Very little attention should be given to memorizing the length of rivers, height of mountains, size of cities, etc. Those of the Amazon and the Mississippi, of two mountains in North America, one in South America, one in Asia, the population of New York, Boston, Chicago, London, Paris, and of course the population of Indiana, of Indianapolis, and of the United States, will perhaps suffice.—*Indianapolis Course of Study.*

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XUM

RESULTS TO BE EXPECTED FROM A SCHOOL COURSE IN GEOGRAPHY*

BY MARK S. W. JEFFERSON

Professor of Geography, State Normal College, Ypsilanti, Michigan

THE first practical question seems to me to be, What is the object of geography in the grades? What result do we desire to attain? What is the nature of the geographic facts and principles that should be imparted in the first eight years of school?

Incidentally we must inquire whether the attainment of these facts of knowledge is to come through mere memory drill, or whether there may be an association of allied facts, a comparison of things and relations that shall contribute to mental growth and culture.

The inquiry is a very wide one, and therein difficult. It might be thought that the common part in our recent text-books is surely what we hope to teach the pupils. On the other hand, I am of opinion that we can examine a text-book profitably only when we have some sort of criterion in mind as to what ought to be included in a public school course. Public school instruction in any subject can only succeed when it knows definitely the objects aimed at, and seeks the most efficient means for their attainment. What, then, is the knowledge, what the power that the geography class should put in the hands of the pupil who enters the high school?

High in importance stand, I think, the thought of the earth as a ball, an acquaintance with the continents and oceans and certain physical features, so dominant as to intimately affect the destinies of wide areas of the earth and its population. In details here are opportunities for wide divergences of opinion, yet I suppose that after oceans and continents, the Rocky Mountains, the Andes, the Alps, and the Himalayas, should be known to every citizen, as also the Mississippi, the Nile, the Amazon, the Rhine and the Danube. It seems to me as disgraceful to be twenty years of age and think the Amazon is in Africa, as to misspell words of one syllable. There are other rivers and mountains innumerable, that I would require no one to learn. Now, this acquaintance with the general earth features will find its value as a basis for acquaintance with our own country and a certain group of other countries that make our own intelligible by comparison and contrast, just as we always get a valuable gain in the use of our own mother tongue when we learn any foreign language.

Among such countries I may name England, France, Germany, Russia,

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MIAMI UNIVERSITY
MAY 1906
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India, China, Japan, Brazil, Argentine, and Chile, without being exigent. Not that no others should be taught, but surely these should be required of all. To set out a list of such countries for all teachers and all schools would not be profitable. I think no such list can be prepared. I would rather say such countries as these are surely too important not to be learned; while others, like perhaps Baluchistan and the German colonies in Africa need not ever be inflicted on the children in America. Some countries are so paramount by their civilization, their history and their commercial relations, that we must become somewhat familiar with them. On the nature of our knowledge, our familiarity with the greater countries of the earth, I should like to lay some emphasis. While we may be content with far fewer details of geographic knowledge than in the past, the extent and completeness of our knowledge of the countries studied, should be greater than it has been. There is need of great change here. To know England should mean to have live, vivid ideas of what England is, what her landscapes, what her shores, what her people, her cities, her villages, and above all, how she lives and what she stands for. How in English history is to be found that idea of representative government which was the germ of our form of government, and has served Europe in the present century as the model on which she has shaped her moderate infusion of constitutionalism.

To know Germany should mean to have some image in the mind of German landscapes and German life and industry, and above all to have a notion of what German patience and thoroughness mean to modern science, and how Germany owes her modern place in the world as distinctly to the strength of union—one great state from many little ones—even as our American republic. To know the Germany of to-day, one needs must know something of Bismarck, something of the rise of Prussia.

So in studying France we must not allow the pupil to be ignorant of that French pre-eminence in matters of taste that impresses itself on French relations with all the world.

And with Russia, shall we fail to point out her great likeness to our material domain in many physical and climatic conditions, as in great staple products and thin population, while her overpowering advantage of nearness to the European and Asiatic markets is thrown away by a governmental system that is Russia's handicap and America's opportunity. What country bounds Russia on the southwest? It is important for the student to know how to find out from an atlas, whenever he needs to know. It is not necessarily a thing to burden all American minds with, while the sort of facts that I have pointed out, the conception of Russia as our naturally endowed rival, the realization that the blessing of individual freedom that we enjoy is direct-

XUM

ly worth, not merely happiness and contentment, but great commercial advantages that we enjoy, not through our own merit, but by inheritance from the founders of our marvelous free government—these are things that the young should come to know.

A few countries, made real in landscape, life and institutions, and those the countries of greatest importance—that is my ideal of the geographic attainment in point of facts for the eight years of the grades.

Many countries ought not to be studied, but ability to look up any country in an atlas, must be taught and much practiced. This is a form of teaching we do not use enough in either the geography or history class. German educational theory on this point is emphatic that maps should not appear in the text-book of geography, since it tends to make the atlas seem superfluous. The German geography text does without maps. So do European geographies generally. The American idea of a small atlas included in the geography, has governed the very shape and size of our books for many years, but is now weakening before a general recognition that the map in the book should at least be very simple. Let us learn to send the pupils to the atlas every day. Let us go there ourselves incessantly. Such a habit, and a coincident use of the encyclopædia will take care of the vast mass of geographic facts.

As a criterion for selecting countries to be taught and countries to be neglected, I think we should look to essential relations with our own land, either in commerce, history, or civilization.

Much use of pictures; many of them, and studied in great detail; diligent inquiry and study by the teacher about every point brought up in the class; talks by the citizens on the things that impressed them on visits any of them have made to distant countries, a geographic material that exists neglected in almost every town; a sufficient amount of map drawing, on nets of actual parallels and meridians; these and similar means should make it possible to give good conceptions of our own country and some foreign lands, within the time allotted to geography in the grades.

The method, I should say, was to elicit ideas, and not teach words. In this respect we shall make a vast improvement if we will go out into the laboratory provided in the world of out-of-doors. All the world is made up of parts, and a vast number of these parts are exemplified in every neighborhood.

For the missing ones, a contrast suffices oftentimes as well as an analogy. This portion of my subject is difficult to express, for few of my readers are accustomed enough to the world of out-of-doors to know these geographic elements that make it up. Let us use a familiar illustration. Millions of

people live on broad plains or deltas that the rivers have brought as sediments from the mountains and spread out at the borders of the sea. Thus the dwellers on the plains of Piedmont, in the basin of Hungary, or on the lowland of North Germany and Holland, live on lands thus built up by the Po, Danube and Rhine, with the materials they have obtained in the Alps in excavating the labyrinth of gorges and valleys that enhance the mountains' height and lend their effect thus to make them stand forth, loftier and more rugged and sublime to the æsthetic sense. Right here in Ypsilanti, are a thousand deltas built and building, from an inch to many acres square. Is it not well to take the children to them, to see them grow, to play upon them, to note their change with every rain, and look for others if we would have them understand those distant lands? Standing on a broad delta and looking back to the gully its materials have come from, can we not, perhaps, arouse a mental image of distant lands that will be a solid foundation upon which to build? Can we not evoke some semblance in the mind of a Ganges plain, leading back to Himalayan gorges? For how many thousand years have men noted the constellations changing with the seasons, the planet wanderings and varying attitude of sun and moon? Yet how many teachers actually have the class gather at noon, or sunset or sunrise (!) to note direction and length of shadow, even three or four times a year? Who takes an evening every month to point out the Dipper, Orion, and the Pole star, the phases of the moon and the actual wanderings of Jupiter, Venus, and Mars among the stars that do not wander? These are chances for positive delight for the children. Yet how many have grown up, unaware of these things as realities, knowing of their names only, and what books say of them, a deadly form of ignorance.

Out-of-door classes in every grade, much exploring of the fields by the teacher before she takes the class, some real knowledge of essentials for a few lands and a few peoples that matter much to us, with much reading, much seeking, much thinking, and the habit of incessantly referring to maps. These are some things that are important in geography in the grades. If programs say that field and sky work cannot be allowed for, in view of the uncertainty of the weather, it is possible that the programs are a bit stiff, and need limbering. If the essential importance of the work is recognized, the program will accommodate it.

XUM

THE TEXT, THE COURSE OF STUDY AND THE TEACHER*

BY R. D. CALKINS

Professor of Geograpny, State Normal School, Mt. Pleasant, Mich.

WHILE there has been a wonderful development of school geography, it has not been a symmetrical development. The text coming from skilled specialists reflects as much of this progress as it can under the conditions. In a measure it has lifted the teacher but it still dominates her and will continue to dominate her until she finds a source of information and a means of discipline in the subject that is higher and better than the text that her class is using. By the system of geographic inbreeding whereby high school and normal graduates often return to the grades as teachers with little, if any, better preparation for teaching geography than when they left the grades as pupils, not only are the errors and bad science of half a century ago perpetuated from generation to generation, but the teacher is robbed of all power of initiative and independent thought and made a slavish follower of the text, often with little if any improvement in her methods of teaching over that of her predecessors who thought the verbatim committing to memory of the text to be the acme of good teaching.

Occasionally a superintendent is spurred into temporary activity by the partial realization of these conditions and before the spell has passed, he may have gone so far as to have changed the text books or even to have *compiled* a course of study for the grades. Seldom does the fever of reform continue until he has penetrated to the geographic preparation of his teachers and has inaugurated a real reform by demanding from normal schools and colleges, teachers, who, along with the other courses which they have taken, have had enough geography to justify their attempting to teach it. Could such a superintendent, together with the other superintendents of the state, have been geography teachers in our normal schools and received into their classes for five or six years, the geographical output of the grades and high schools, I assure you the realization of conditions would be anything but partial, and they would be in a position not only to understand but to pardon any little pessimistic outcroppings which may appear in the midst of my usual optimism.

There are several reasons why every city and town should have its own carefully worked out course of study in geography. There are also several

* Part of a paper presented to the Michigan Teachers' Association, Dec. 1904.

reasons which, for the present at least, will tend to prevent such a course from accomplishing the ends desired. It is quite essential that we consider briefly these various causes and reasons.

As we have already intimated, the child's knowledge of geography must be built upon his own conscious geographic experiences and not upon definitions and the printed pages of a text. For the greater part of the work, the child is asked to go in imagination to regions he has never seen, there to work out and understand some of the relations which exist between the life of a people and their environment. To ask him to do this without giving him through experience the fundamental geographic concepts out of which he can build these mental pictures of distant lands, is to commit a crime against the psychological nature of the child.

The general acceptance of the truth of this principle has led to the introduction of local or home geography work into the lower grades in most schools. As yet, however, this work has not generally been so organized and correlated with the work of the other grades as to give the whole course the unity and interdependence which it should have. Superintendents have not yet sufficiently realized that since local conditions vary widely from place to place, not only the home geography work, but the courses built upon it, must also vary. There is too much of a tendency towards uniformity in our courses in local geography. . . .

The formulation of a course of study in geography is one of the most difficult problems which confronts the superintendent. It implies, in the first place, such a knowledge of the principles of modern geography and the regions of the earth as will enable him to recognize those features of the local environment which are not only closely related to the child's interests, but which are so common to all environments that through them, the child may reach with his imagination and understand the more distant regions of the earth. It implies, in the second place, such an appreciation of child nature and the ways in which the child acquires new knowledge as will enable the superintendent so to correlate the work of the whole course that the progress from grade to grade shall be without break in logical sequence while at the same time following a pedagogical order that shall do no violence to the developing mental powers of the child.

Even when the formulation of a course of study has been accomplished there still remains the serious problem of carrying into effect its various provisions. Take for example the course which has just been under discussion. Whatever it may lack and in whatever respect it may fail, it still has three things to commend it for which grade geography to-day stands in greatest need. In the first place it is not based upon and tied down to any

XUM

existing series of text-books. Secondly, it places proper emphasis upon the map and map study, and in the third place it calls for abundant out-of-door observations. Now it is quite evident that back of these three phases of geography which the committee has emphasized, there is a fourth essential which must be assumed and without which little can be accomplished. To break away from the text as the course does, to make and study maps as recommended and to carry on the out-of-door observations as outlined, it is necessary to have in every grade a teacher who knows both the geography of books and the geography of out-of-doors far better than does the average grade teacher to-day. I should like to see this course of study attempted in every school in the state just for the sole purpose of convincing superintendents that their grade teachers, as a rule, are not well prepared in geography. Even then, in event of failure, I am not sure that it would not be the course of study rather than the teacher's preparation which would be blamed.

Aside, however, from the lack of adequately prepared teachers, another difficulty presents itself. Existing text-books as a rule are not such as can be easily and profitably used with such a course of study. Knowing that a majority of the teachers will follow a text and follow it blindly, authors and publishers have been so intent upon producing a book which will be popular and sell well because it can be thus followed, that they have forgotten as a rule the needs of the few well-prepared teachers who require a book of an entirely different sort.

There seem to be two respects wherein authors in adapting their books to the needs of the many, have thus failed to meet the needs of the few. On the one hand, an author attempts not only to describe and explain in his text but to teach and develop the whole subject as well. His descriptions and explanations are continually interrupted by questions and directions to the pupil. Another author, unable to assume a teacher, fills up his text with information which could have been acquired in some other way with far more profit to the pupil and a great saving of space for more important matter. Now a teacher who knows geography and can teach it will prefer to ask her own questions. She does not need or want an author to tell her pupils what maps to draw or essays to write. Then again there is a certain amount of information which a child can and should acquire for himself by observation, map study or reasoning, and the teacher does not want the beneficial effects of his acquiring it in one of these ways spoiled by the author telling it all in his text. What such a teacher wants is a book whose author recognizes her existence by leaving something for her to do, and then gives in clear, concise English, uninterrupted by questions and side issues, a

fund of geographical information to which she can refer her pupils with some hopes of their finding what she wants them to find. What is such a teacher going to do, however, when, after having worked out with her class from globe and map, the main facts concerning the position, form, size and the surface of a continent, she turns to a text and finds in the six pages used to describe these topics, the facts which the class do not already know, can be stated on a single page—six pages of straw to be threshed over to get one page of badly shrunken wheat? What a drop in interest for these young explorers of globe and map to come to the text to find something of interest about the regions they have been thus studying and then to find only a dry recital of the very same facts which they had just discovered for themselves. After many such experiences with text-books, what is such a teacher going to do? Do just what so many teachers have been compelled to do who have tried to use existing texts with a course of study; viz.: abandon the text and look elsewhere for the desired information.

Although pupils can often be sent to these various sources of information with great profit, the teacher will still have need for a text-book from which she can assign definite lessons to be studied and mastered. The overcrowding of the grades caused by the so-called enriching of the course, has tended to increase the number of recitation periods and cut down the study periods until, in some schools, there is danger of the pupils becoming little phonographs, receiving and returning very accurately what the teacher gives them but still unable to acquire anything of themselves. To read a page of English and know what is written there is still a great art. To preserve that art and with it the art of study, there will always be a place for a text-book of geography in the schools. . . .

GEOGRAPHY IN THE GRAMMAR GRADES

Pupils who are in the last years of the grammar school ought to study synthetically. Hitherto they have studied as children, learning certain facts in order, because they are interesting, or because it was their duty to study as directed. They have not consciously looked far beyond this learning of facts. They should have now the power, and should be required to gather up these great groups of facts and view the subjects as a whole, with due relation of parts. This is the kind of work that fits their mental needs, and that will prepare them for the scientific study of the high school.—*From Report on Geography, New England Association of Superintendents.*

XUM

TRANSPORTATION—PART V*

BY J. T. HOLDSWORTH
Drexel Institute, Philadelphia, Pa.

THE MERGER PERIOD

THE year 1898 marks the beginning of a period of rapid industrial expansion in this country. Many of the giant corporations, familiarly known as trusts, date from about this period, and the influences which gave rise to them were likewise responsible in large part for a new development in the railway situation. Capital in abundance sought investment in all kinds of commercial enterprises. Prosperity ran at full tide. The consolidation of small concerns into giant corporations proceeded at an amazing pace. In this general movement toward commercial and industrial centralization the railways shared. From their earliest development railways had found some unity of action essential to profitable business. The disastrous results attending unrestrained competition among rival lines had been common experience. Pooling was the most successful and practicable device attempted to maintain equitable rates and to obviate the needless wastes of competition. The prohibition of pooling and rate agreements came at a time of unprecedented prosperity and expansion in all branches of industry. Capital and confidence knocked at the door of enterprise all over the land. Under such conditions railway consolidation was as rapid as it was logical. Capitalists and promotors found no difficulty in floating the securities of new or acquired lines and mergers and consolidations followed fast.

These consolidations have been effected in various ways:[1] (*a*) by purchase or lease; (*b*) by the device of the holding company; (*c*) by community of interest. The great activity and confidence of capital in the last few years has made amalgamation by purchase possible in many cases. The sale of the Lake Shore to the Vanderbilt interests, of the Western Maryland to the Wabash, and the Central Railroad of New Jersey to the Reading, are instances of comparatively recent purchases. Other consolidations have been effected by lease, as in the case of the control of the Boston & Albany by the New York Central, or the joint lease of the Georgia Railroad by the Louisville and Nashville and the Atlantic Coast Line. A much older and more elastic method of amalgamation than either of these is the plan by which a group of railway capitalists purchase enough of the shares of another company to control its management. Thus the 'Frisco system controls the

* Continued from Vol. IV, p. 80.

[1] Report of the Industrial Commission, Vol. 19, p. 310.

Chicago and Eastern Illinois, the Pennsylvania controls the Long Island R. R., and the Southern Railway jointly with the Louisville and Nashville controls the Chicago, Indianapolis & Louisville (Monon Route). In some cases control has been secured by the purchase of less than a majority of the shares of stock. The ownership by the Pennsylvania R. R. of $40,000,000 of stock out of a total of $105,000,000 gave that system control of the Baltimore & Ohio. Similarly the Union Pacific gained control of the Southern Pacific through the purchase of only $85,000,000 of stock out of a total of $192,000,000.

The most recent and satisfactory method of securing unity and harmony among rival railway interests is through "community of interest." By this method one or more of the directors or officials of one company are made members of the board of directors of another company, and often the influential members of each company become financially interested in the other. The term, community of interest, however, has come to be applied loosely to any arrangement by which one railroad becomes interested in the property of another. Instances of this new device for securing harmony among rival railway groups are plentiful. One of the earliest of such agreements was the joint control of the bituminous coal roads, the Chesapeake & Ohio and the Norfolk & Western, which had long been thorns in the flesh of railway amity, by agreement between the presidents of the Vanderbilt and Pennsylvania systems. Later, community of interest was established between the Pennsylvania and the Baltimore & Ohio. Early in 1903, it was announced that the Baltimore & Ohio and the Lake Shore had secured joint control of the Reading, which in turn owns a majority of the stock of the Central Railroad of New Jersey. Indeed, community of interest and joint control have proceeded so far that in many cases it is almost impossible to tell what interests actually dominate a particular road or system. Thus, in 1901, representatives of the Erie, the Lackawanna, the Central of New Jersey, and the Lake Shore entered the directorate of the Lehigh Valley Railroad. Mr. H. T. Newcomb, writing in the Review of Reviews for August, 1901, noted that eleven of the twelve directors of the Missouri Pacific were members of the boards of other companies, which operated at least 1,000 miles of line. One or more Missouri Pacific directors served at that time on the boards of the Chicago & Alton, International & Great Northern, St. Louis Southwestern, Little Rock & Fort Smith, Galveston, Houston & Henderson, Kansas City Southern, Central of New Jersey, Lackawanna, and numerous smaller railways. More recent instances might be cited to show the development of identification or community of interest in railway control. Thus, the New York Central directorate is repre-

XUM

sented in the Union Pacific, the St. Paul, the Northwestern, the Atchison, and others, and to cap the climax, Mr. E. H. Harriman, director in thirty-five railroad companies, enters the directorate of the New York Central. It is not unusual, now, to speak of the Harriman-Rockefeller group, or, even, of the Harriman-Rockefeller-Gould interests, which serves to indicate the extent to which association among the powerful railway groups has gone.

Consolidation through the device of the holding company finds several notable illustrations in recent railway history—the Rock Island Company, the Southern Pacific Company, the Northern Securities Company, and others. The Rock Island System is composed of "a parent holding company located in Iowa, and two large operating companies, each of which is also a holding company for the securities of other railroad companies."[1] The Rock Island Company controls the Chicago, Rock Island & Pacific Railroad Company, which in turn controls the Chicago, Rock Island & Pacific Railway Company. The Railroad Company has a controlling interest in the St. Louis & San Francisco, which owns the Kansas City, Fort Scott & Memphis Railway, which again in turn has a controlling interest in the Kansas City, Memphis & Birmingham.

The history of the rise and development of our railway systems abounds with dramatic incident, but the annals record nothing, perhaps, more spectacular, more significant, than the recent episode of the Northern Securities Company. The story of Northern Securities is much involved, but the following summary generalizes the salient facts. The Hill roads, the Great Northern and the Northern Pacific, stretching away from the headwaters of the Great Lakes and the Mississippi Valley in long parallel lines to the Puget Sound and the Pacific, lacked the one essential to highest success in Western railway traffic—direct entrance to Chicago. For years the Hill-Morgan interests manœuvred to secure a connecting link between their terminals at St. Paul-Minneapolis and Duluth, and Chicago, the greatest railway center in the world. Control of either the St. Paul or the Burlington would provide this link. In 1901, negotiations were entered into looking to the purchase of the St. Paul, but these advances failed. The Hill-Morgan interests then turned around and purchased the Burlington, paying for it about $216,000,000, in the joint bonds of the Great Northern and the Northern Pacific. Now, this alliance between the two great trans-continental roads at the north and the Burlington, whose lines spread out from Chicago to the great primary traffic regions of the trans-Mississippi states, seriously threatened the business of the great rival Pacific road, the Union Pacific. Accordingly, soon after the Burlington purchase, Mr. E. H. Har-

[1] Prof. E. S. Meade, in Railway World, January 13, 1905.

riman asked for the privilege of buying Burlington shares upon like terms to those granted to the Hill-Morgan people. His request was refused. Harriman then determined upon the bold move of buying up enough Northern Pacific stock to control that road and so indirectly to get possession of the Burlington. The result was the "raid" by the Harriman interests and the Northern Pacific corner culminating in the panic of May 9, 1901, with stock at $1,000 per share. When from the chaos order was restored, it was found that Harriman held a majority of the stock of the Northern Pacific. Out of a total capital stock of $155,000,000—$75,000,000 preferred and $80,000,000 common—he held $78,000,000, $41,000,000 preferred and $37,000,000 common. Inasmuch as the preferred stock holders had the voting powers it appeared, *prima facie,* that the Union Pacific had control of the Northern Pacific and thus of the coveted Burlington. But the charter of the Northern Pacific Company provided that the preferred stock might be retired at any time before 1917. The Morgan-Hill interests seized upon this provision, retired the preferred stock, added to their own holdings of common by purchase of additional shares, and so regained by strategy what they had lost in the battle of the stock markets. To prevent the recurrence of such a disastrous raid, and to establish their properties on a permanent stable basis, Hill and Morgan determined to form a "holding" corporation for the purpose of acquiring and holding the shares of the railroads under their control. Accordingly, the Northern Securities Company was incorporated in New Jersey on November 13, 1901. "Through Mr. Pierpont Morgan a compromise was effected by which all the clashing interests were represented in the new company. Within a short time after incorporation, the Securities Company had acquired 76% of the entire stock of the Great Northern and 96% of the Northern Pacific. The stockholders of the two competing companies disappeared, as such, for the moment, but immediately reappeared as stockholders of the holding company which was hereafter to guard the interests of both sets of stockholders as a unit."[1]

Having weathered the gale of financial opposition, the Hill-Morgan combination was to face more trying storms from a different quarter. In the belief that the Northern Securities merger was intended to check the natural competition of the two parallel roads thus merged, the state of Minnesota brought suit against the Northern Securities Company on the ground that it was in violation of the anti-trust law. This suit came to naught through a decision of the Supreme Court that the state lacked jurisdiction. In March, 1902, however, a suit was entered in the Federal Circuit Court on behalf of the United States. This court held that the Northern Securities Com-

[1] Annals of the American Academy of Political and Social Science, July, 1904.

pany was a combination in restraint of trade, and issued a decree which in effect temporarily checked the further consolidations of the companies concerned. The case was appealed to the Supreme Court of the United States, which, after hearing arguments by some of the most brilliant advocates of the American bar, decided by a vote of five to four against the Securities Company. In affirming the decree of the lower court, the Supreme Court decision, though not pronouncing the holding company illegal, nor ordering its dissolution, broke it up effectually by enjoining the two railway companies from paying over to it dividends on the stock. Nothing remained then to the company but to return the stock to those who had given it in exchange for Northern Securities stock. This might be done in either of two ways: (1) by returning to each stockholder his original stock; or (2) by giving back to each shareholder an equivalent of his Northern Securities holdings in the shares of both Northern Pacific and Great Northern. The latter method was adopted. By this plan of redistribution, the Harriman interests, instead of receiving back their original Northern Pacific shares, and so control of the road, would receive a ratable proportion of the stock of both roads without control of either.

Mr. Harriman and Mr. Pierce, as trustees for the Oregon Short Line, a Harriman road, began suit to prevent the Hill-Morgan interests from carrying out their scheme of redistribution. An injunction forbidding the distribution was granted by the New Jersey courts, but on appeal the case was carried to the Supreme Court of the United States which in March last handed down a decision which seems to remove the last objection to the Hill-Morgan plan of distribution, and which leaves possession of the Northern Pacific and the Burlington in the hands of that interest.

The effect of the Northern Securities decision upon prospective railway mergers and consolidations is very well summarized by Dr. Garner in the Annals already quoted. "The Eastern mergers," says Dr. Garner, "embracing about 85% of the railway mileage of the United States, will not be disturbed by the Government. This comforting assurance was given by the Attorney-General in an interview following the announcement of the decision of the Supreme Court. He declares that the Government during the prosecution of the Northern Securities Company refused to give any heed to the contention of the defendants that all the railroad 'mergers' in the country were on trial, but insisted that it was the validity of the Northwestern 'merger' only that was in issue. Having succeeded in suppressing this one, the Government did not propose to run amuck. No explanation was given why this particular one was singled out for prosecution and the others allowed to go free." In conclusion Dr. Garner doubts "whether

after all anything of permanent value has been gained by the prosecution and the resulting decree of the Court."

Mr. Charles A. Prouty of the Interstate Commerce Commission comments on the Northern Securities decision in much the same vein: "Without attempting to forecast future decisions of the Supreme Court upon this subject, it is not too much to say that, in all human probability, the Northern Securities decision will not result in the dissolution of a single railroad combination now existing, except the Northern Securities Company itself, nor seriously interfere with the formation of other combinations."[1]

That these opinions are well-founded is attested by unabated activity in consolidations and mergers since the Supreme Court decision, notably in the case of the Père Marquette-Cincinnati, Hamilton & Dayton merger, the absorption of the Ontario & Western by the New York, New Haven & Hartford, and the incorporation in 1902 of the Rock Island Company, whose charter follows very closely that of the Northern Securities Company. Almost every annual report of the larger railway systems announces the absorption of minor roads or companies previously purchased or leased, and there are rumors of yet larger consolidations to come.

(*To be continued.*)

WEAKNESSES IN GEOGRAPHY TEACHING

Among the faults in teaching are these:

1. Too much talking by teachers without a purpose.
2. Lack of definite aim in teaching. "What do I propose to teach in this recitation?"
3. Failure to make use of the blackboard, map and globe.
4. Too much dwelling upon trivial details, such as comparatively unimportant cities, rivers, events, etc.
5. Dependence upon the text-book.
6. Lack of interest and enthusiasm on the part of the teacher.
7. Lack of broad and accurate scholarship.—*Indianapolis Course of Study.*

[1] North American Review, June, 1904.

VACATION FIELD WORK FOR PUPILS

BY C. L. WALTON

Lakeview High School, Chicago, Ill.

IN large city schools where several hundred pupils are studying physical geography, it is very inconvenient and in some cases almost impossible to do any satisfactory field work in connection with the subject. To be of much value to the pupil the places that are visited first should possess striking but simple topographic features, but after some practice in observation work has been obtained, less pronounced and more complex forms will give satisfactory results. As a rule pupils enjoy field work and hail with delight the announcement of an excursion, but their desires cannot always be gratified owing to poor transportation facilities or to distance from the school of the place of interest.

As a large number of pupils spend a part of the summer in the country, the teacher might suggest to them, in the latter part of the spring term, some lines of observation work to be carried on during their vacation. These suggested lines of work should be in harmony with the region that the pupils expect to visit and as definite as possible. In the Northern cities hundreds of pupils go to some inland lake where glacial topography is abundantly displayed and if they had some plan of observation work to follow, their outing would possess a value much beyond that of mere physical recreation. An hour or two each morning spent in research work would give zest and point to the pleasures of the remainder of the day.

During a visit last summer to a small glacial lake in Michigan the writer was reminded of the following simple lines of investigation which a pupil of average ability and with a year's training in physiography would have but little trouble in working out. Before much satisfactory field work can be done it will be found necessary to construct an outline map of the lake and vicinity on as large a scale as possible, say ½ or 1 inch to the mile, but if the lake is only two or three miles long then a scale of 4 inches to the mile or even 8 inches to the mile will be convenient. A large sheet of wrapping paper or a light colored window shade will be excellent for the map. For the purpose of locating points and estimating distances this paper should be ruled into quarter or eighth inch squares, and then with the help of a county map, which usually can be consulted, the section lines and general dimensions may be obtained. The details are to be filled in by careful observations and by measurements along the shore either with a tape line or by pacing. The first draft will probably not be very accurate,

but during the summer corrections should be made until the map shows fairly well all the details of shore line in proper proportions. After the map has been corrected in pencil it should be gone over in ink.

The topography of the lake bottom should be shown on this map by 5 ft. or 10 ft. contours, depending upon the depth of the water. The sounding line should be a stout cord with knots tied in it every two or three feet and a half pound or a pound "lead" fastened to the end. The soundings must be made when there is little or no wind to drift the boat and at as frequent intervals as will give fairly accurate results. Two persons can do this work much better than one. The leadsman sits in the stern and the oarsman pushes off, gets his bearings, takes ten or twelve strokes and stops the boat; the leadsman lowers the line and counts the knots as they slip through the fingers until the lead reaches the bottom, and again counted, as a check, as the line is pulled in. Then the same number of strokes are again taken and the sounding obtained. These depths should be recorded on a piece of paper or a hastily sketched map and afterwards transferred to the permanent map. When the map has been well covered with data the contours should be drawn and the figures erased, excepting those that show the greatest depths. These deeps should be given appropriate names. A blue shading could be used to show the depth in addition to the contours.

While making soundings and at other times when anchoring about the lake, observations should be made on the character of the bottom, whether hard or soft, coarse or fine, composed of vegetable, animal or mineral matter. In some lakes deposits of carbonate of lime are forming, and if any are found their location and extent should be determined and recorded on the map. These deposits may form on clam shells and pebbles near the shore, and if found anywhere it is an evidence that dissolved limestone has been brought into the lake.

The most numerous and conspicuous water plants should be observed, their location mapped and their habits of growth such as depth of water and character of bottom carefully noted. The list should include the water arum or wild calla, the white water-lily, the yellow pond-lily or spatter dock, the pickerel weed, the arrow head, the chara, the blue flag or iris, the reeds and the pond weeds. All these grow at or above the surface of the water except the chara, which is the fine-leaved, ill-smelling, green weed often brought up with the anchor.

At the same time that other observations are being made the temperature of the lake water should be taken and tabulated. For this work a maximum-minimum thermometer must be used to get the temperature of the water at the bottom of the lake. The floats in the thermometer must be

XUM

set, the instrument securely tied to the sounding line near the end and lowered to the bottom. Five minutes will be ample time for the mercury to become stationary when the thermometer can be brought to the surface and the temperature noted. In the deepest places the temperature should be taken for every five feet of depth, near the surface every two feet, and a curve plotted on cross-section paper to show how the temperature changes with the depth. The temperature of the deeps should be taken once a week and the surface temperature every day. If possible the temperature of the water running into the lake, either from streams or springs, should be compared with that running out of the lake as well as with the water in the lake itself. As the surface water drifts with the wind it will be observed that the temperature of the water, and consequently the bathing conditions, will depend somewhat upon the direction and velocity of the wind. The larger the lake and the stronger the wind, the greater will be the change in temperature. For the purpose of making general comparisons the air temperature should be taken early in the morning and in the middle of the afternoon.

If the lake has only one or two inlets the volume of inflowing water should be carefully measured. This may be done at a bridge where there is a uniform channel, by getting a cross-section area of the water and finding the number of gallons of water that flows through in a minute. The rate of flow can be ascertained by seeing how long it takes a chip or blade of grass to be carried from one end of the bridge to the other. A similar test should be made at the first bridge below the outlet and the difference in results will represent the water lost by evaporation, by soaking into the ground, by being taken up by plants and animals, etc. If any considerable quantity of water enters the lake from springs this amount should be made a part of the calculation.

The difference in clearness of the water at the inlet and at the outlet should be observed at various times and especially after a heavy rain when much sediment is brought into the lake. This experiment may be performed by taking a glass, or bright tin dish full of water at each place and noting the difference in distinctness of the bottom of the dishes when seen through the water. These two might be further compared with a sample from the middle of the lake. These comparisons will show where the sediment settles and also why the outflow is seldom muddy.

The amount of sediment held in solution by the water may be determined by evaporating to dryness, a dishful of water that has been filtered through two or three thicknesses of cloth to remove the suspended material and noting the amount of deposit on the bottom and sides of the dish.

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This deposit probably consists of the carbonates of lime, magnesium, sodium, potassium, and possibly iron, salt, gypsum and silica.

The effect of the wind upon the lake should receive some additional attention to that mentioned above, such as the run of the waves considered in connection with the direction of the shore line, also where the waves are largest and go with the greatest speed, where they are wearing away the bank and where depositing sediment. Any changes in the shore line that the waves are making should be investigated and their character and extent determined. It may be found that long points of land have been worn away and that extensive fillings have been made elsewhere. Spits, hooks and sandbars should be carefully observed and the source of the sediment determined.

Observations on the variation in the height of the water should be made and the causes studied. The data for this study can be obtained by fastening a half submerged foot ruler to the pier or to a stake driven firmly into the lake bottom near the shore and where it will not be disturbed. If this gauge is placed at one end of the lake the effect of the wind will be better shown. To get the reading when the waves are running, the gauge should be shielded by a board or the boat and the average of the rise and fall taken to represent the true level of the lake.

The topography of the land immediately surrounding the lake should be studied as opportunity offers and represented on the map by 5 ft. or 10 ft. contours, the same as the lake bottom. With a little vertical measuring and some careful observation as to distance at the outstart, a very good map of the region can be made without the use of instruments. Roads, drives, paths, residences and other culture features should be located on the map. When the topographic work for both lake bottom and surrounding country is completed some later leisure time might be profitably spent in making a relief model of the place by using paper pulp or thin cardboard. If cardboard is used a sheet should represent a contour interval. The lake bed may be colored blue.

As far as possible the flora of the surrounding country should be studied; at least the names of the trees and the character of the soil in which each kind grows, whether high or low, wet or dry, sandy or clayey, should be noted. If there are islands in the lake it should be ascertained if the trees there are in any way different from those on the main shore under similar conditions of soil.

Observations should be made along the shore for evidences of a former extension of the lake. Old beach lines higher up the bank, low, swampy land bordering the lake in places and the wearing down of the outlet would be some of the indications. On the other hand the outlet may be filling up

XUM

with weeds and driftwood and so raising the level of the lake. This may be shown by the waves cutting into the bank, by the absence of sandy beaches, by the decaying stumps of trees standing in the water and by the inlet having a drowned appearance.

The convexity of the earth's surface may be demonstrated if the lake has a shore line of such a character that three stakes of equal height above the water and at least a half mile apart can be placed in a straight line. By sighting over the stake at one end with a pair of field glasses, the second stake will appear a little higher than the third.

It is presumed that during all this time piscatorial pursuits are not neglected. The early morning and the late afternoon are prime occasions for landing some good catch. Here, too, the results should be shown on paper. An accurate drawing of the largest fish of the various kinds in the lake should be made, and if at any subsequent time a larger is caught, a drawing of it should replace the previous one. To make the drawing the fish should be wiped dry, placed on a piece of paper and the fins, tail and mouth slightly spread; then the outline can be traced with a pencil and the details filled in with the specimen at hand. The drawing should be labeled and such information as time of day, date, weight, place, depth of water, bait, etc., given. Such a "fish story" will be more convincing than any other kind can possibly be.

Photographic views of interesting places and objects will add very much to the value of the written results in each of the different lines of work.

The above suggestions for observation work are not all that might be mentioned but probably enough has been given to lead pupils to see what they can do in the way of original investigation if they so desire. Of course it is not expected that any pupil will complete all the work outlined even if conditions are most favorable, but they may select those that appeal to them and that appear most strking in their locality.

CORRELATION

Rationally followed the principles of correlation are of great value, but the teacher who is ever conscious when she employs correlation is doing poor work, because she is absorbed, not in her subject, but in the mechanics of presenting her subject. A good teacher cannot help having one subject assist another, but the transition from one subject to another should be as natural and easy as that of a carpenter when he drops a plane and picks up a saw.

EDITORIALS

EXPRESSION WORK IN GEOGRAPHY TEACHING

THE concise and well established educational phrase—"no impression without expression" seems to be one of those familiar and somewhat unfortunate phrases in modern educational literature which is often dangerous because accepted as a maxim when it is only partially understood.

That geography teaching often suffers because pupils are crammed with items of little value and not given an opportunity to show their knowledge in any effective way is unfortunately only too true. That many facts and principles in geography are of a nature to be effectively illustrated and that the knowledge of these facts and principles can be readily tested by their ability to express their conceptions through constructive work in wood, iron, paper, clay, sand, or by brush or pencil is equally true. It is not true, however, that for all pupils, manual training and art work form the only or even the best means whereby pupils can give expression to their ideas about geography. Many children are more skilful with voice or pen than in making things, and for such children to be compelled to express their ideas through their ability in fine arts or manual training and to have their knowledge of geography tested in this way is very unfortunate. Their results, judged from the standpoint of geography, may be less successful than the results of their less well informed colleagues who have a certain natural aptitude for manual training or art work.

If the phrase "no impression without expression" is interpreted broadly so as to give full value to oral or written presentation of thought, there is no quarrel with it from the standpoint of geography. If, however, it is interpreted narrowly as an argument for forcing manual training or art into the geography time schedule for all pupils, because it is assumed that in no other way can pupils really express themselves, geography teachers should express their disagreement forcibly. No argument is necessary to prove the value of manual training or art in a course of study, for their importance in the present and as contributions to a pupil's power are too great to be questioned. The value of these forms of education as things by themselves is not, however, a proof of their value to all pupils as handmaids to geography.

Geography teachers should encourage pupils to express their geographic ideas in the way that is most effective for the individual, and should apply manual training and art in their geography lessons whenever such work will make their geography more effective. They should suggest to the

teachers of constructive work ways in which the facts and principles of geography can be applied in manual training or art work. The teacher of constructive work should adopt these suggestions if they are effective for their purposes. If, however, they can teach their particular subject better by not using suggestions drawn from geography they should neglect the geographic side at the moment.

The interrelation of subjects in the school curriculum should not be forced. One subject should be made to help others wherever possible, but let us remember that in the geography period we are primarily working with geography and that any intrusions that would weaken the effectiveness of our geography work are inexcusable even though the maxims of educational literature may seem to warrant such digressions. Coöperation between subjects implies mutual help and not one-sided sacrifices.

NEWS ITEMS

A New Association of Geography Teachers.—A number of teachers and workers in school geography living in and around New York City have recently formed the Geography Teachers Association of New York. The association will make a study of certain practical problems in school geography teaching and will hold monthly meetings during the school year at which reports of work will be made, problems discussed and better acquaintance promoted. The association is not to be formal in its organization or plan of work. Each member is expected to be a worker and contributor to the cause. Committees have been formed to prepare summaries and regularly furnish the club with references to available and valuable literature; to make similar summaries of useful government reports to be had on request; to keep in touch with new apparatus and equipment; to arrange and conduct excursions; and to arrange for the publication of materials of value to teachers. The affairs of the association will be managed by an executive committee of five, of which Miss Mary H. Kelton of Adelphi Academy, Brooklyn, is secretary. This committee will plan the meetings, outline the work to be done, receive the reports of the committees and decide on applications for membership. Through the courtesy of the American Geographical Society, the association will hold its meetings at the new home of the society on West 81st St.

RECENT PUBLICATIONS

HISTORIC HIGHWAYS OF AMERICA. By Archer B. Hurlbut, Cleveland, Ohio, The Arthur H. Clark Company, 1905.

Volume 15, The Future of Road Making in America, pp. 211. Includes strong arguments for good roads and the necessity of coöperation in securing good roads. Also a chapter on the materials for roads, and the success of the movement in New Jersey. An excellent treatment of a timely and important subject. Illustrations not as eective as many that have appeared in Government and State Reports.

Volume 16, Index, pp. 188.

The Index volume includes all topics treated in the first fifteen volumes of the interesting and valuable but somewhat expensive series of volumes devoted to Historic Highways in America.

NEGRITOS OF LAMBALES, being Volume II, part 1, of the Ethnological Survey of the Philippines. By William Allen Reed, pp. 90. Manila, P. I., 1905.

A well illustrated and extremely interesting account of the mental, physical and social characteristics of the Negritos. Simply written and valuable for reference.

LONG RANGE WEATHER FORECASTS. By E. B. Garriott, U. S. Department Agriculture—Weather Bureau, Bulletin No. 35, pp. 68. Government Printing Office, 1904.

Valuable summary of the possibility of long range weather forecasts. Sections on the relation of the weather to the moon and the sun should be read by all interested in weather or good geography teaching.

WALL OUTLINE MAPS [32x44]. Published by The McKinley Publishing Co., Philadelphia, Pa.

The two outline maps devoted to the United States and to Europe recently published by the McKinley Co. are most excellent and valuable. Printed on good paper of a neutral tint, they furnish excellent bases for making maps for class use, to illustrate social, political, historical and economic facts, not available as wall maps that can be bought in the open market.

"NATURAL PHENOMENA"

Courses of study in geography and suggestions as to geography in the primary grades frequently include the topic "Natural Phenomena" as one of the several groups of topics pertinent to elementary work. This is usually meant to include observations of the weather, of the work of running water and similar out of door phenomena. The term "Natural Phenomena" is not, however, clear as to meaning, and implies that geography may include also unnatural or supernatural phenomena. It is a good instance of a term loosely and carelessly used, as terms in geography should not be.

XUM

CURRENT EVENTS

THE WORLD'S HIGHEST BRIDGE ACROSS THE ZAMBESI

THE British South Africa Company at London, received a cable dispatch from Victoria Falls announcing that the bridge over the Zambesi River, the highest in the world, was linked up at 7 o'clock on the morning of April 1, thus completing another link in the chain of the Cape-to-Cairo Railway.

THE CAPE-TO-CAIRO RAILWAY

The Cape-to-Cairo railway, for which the great bridge over the Zambesi has just been linked up, its arch 420 feet above the water of the river, is in many respects one of the most remarkable projects which ever emanated from the brain of man.

It is the first great trunk railway ever designed to span a continent from north to south. It is the first railway projected to cross the equator at right angles and the only railway in the world which has ever been designed to cross territory across which no road, trade route or human traction way has yet existed. No Government is at the back of it. No financial syndicate hopes to make money out of it. That it should exist even in the realm of imagination is due solely to the creative genius of one man, and that the man who was stripped of all his official positions and solemnly censured by a Parliamentary committee.

To Cecil Rhodes—who died when only about 3,000 miles of the 6,600-mile line was completed—must be given credit for the vast plan to develop a continent.

The cost of the entire line will be not less than $125,000,000—perhaps a great deal more. But at the beginning he furnished most of the money himself. Pushing up from the Cape through Rhodesia, he met his first great obstacle at German East Africa. For the right of way through 700 miles of its territory the German Government drove a hard bargain. It forced him to agree that at the end of forty years it should take over that part of the line which traversed its land.

Steadily but surely the railway has progressed. North from Cape Town, and south from Cairo and Khartoum, it has evolved from a formless dream into a line of steel that is opening one of the great empires of the future to civilization.

Already the most stupendous tasks—one of which was the bridging of the Zambesi—have been accomplished. By 1909, the date set by Rhodes, the African empire builder, the gigantic project may be completed.

CROPS THAT WILL RIPEN AROUND THE WORLD DURING APRIL

WHEAT.—Northwest Province and Bengal, India (ending); Punjab, Sind, Central States, Rajputana and Bombay, India (beginning); Upper Egypt (begins late in month); Mexico.

OATS AND BARLEY.—Northwest Province, Bengal and Punjab, India; Canary Islands, Egypt.

CORN.—Cape Colony, Victoria, Australia, Tasmania, New Zealand, Argentina.

RICE.—Burma and Bengal, India (summer crop).

BUCKWHEAT.—Victoria, Australia.

CLOVER.—Egypt, Victoria, Australia.

ALFALFA.—Southern California, Arizona, New Mexico, Mexico.

PASTURE.—Along Tropic of Cancer.

COTTON.—Paraguay, Uruguay, Brazil, Peru, Bolivia, Bombay, Madras, Northwest Province, Nizam, Patria, India.

SILK.—India, Siam (begin to reel from cocoons).

FLAX.—Egypt (to April 15).

RAMIE.—Egypt(spring crop).

SHEEP SHEARING.—Texas, Arizona, New Mexico, California.

SUGAR BEETS.—Egypt (end of winter season).

MAPLE SUGAR.—New England States, Canada, and, to a lesser extent, throughout northern tier of states to Minnesota.

FRUITS.—STRAWBERRIES—Florida, Southern California, Arizona, New Mexico, Texas, Louisiana, and along Gulf; Egypt, Northern Africa. APPLES, Algiers (early). APPLES, PEARS, ORANGES and other CITRUS FRUITS are near the end of their season in India, Egypt, Northern Africa, Southern Europe, West Indies, Central America, California and the South Sea Islands. The first PLUMS are ripening in Arizona. PERSIMMONS and GUAVAS, Victoria, Australia.

VEGETABLES.—April in the Northern Hemisphere corresponds to October in the Southern. The season for green things at Cape Town, Buenos Aires and Sydney has come to an end, while along the Tropic of Cancer all garden vegetables are had in abundance. Southern Europe, Cuba, Mexico, the Gulf States and Southern California have LETTUCE, RADISHES, ONIONS, PEAS, STRING BEANS, BEETS and ASPARAGUS. In the warmer regions, TOMATOES, POTATOES and CUCUMBERS are ripe, and all these have found their way to New York and London markets. India and Australia are digging SWEET POTATOES, and all the Southern Continents their winter supply of POTATOES.—*The Little Chronicle.*

WIRELESS TELEGRAPHIC FEAT

A message has recently been sent from the Marconi station in Cornwall, England, to a station in Ancona, Italy. It was safely transmitted and duly answered. It is not the distance between the two points that is remarkable, as this is only 1,000 miles; but the fact that the message had to be sent overland. The electric waves had to pass over nearly the whole of France and a fair portion of Italy, including some of the highest peaks of the Alps. Herein is the surprise, as it has been thought that land transmissions were doubtful, because of the many intervening obstructions.

WATCHING FOR HURRICANES

The "hurricane belt," as it is commonly known, lies, roughly speaking, between latitude 10° and latitude 30°, north, and extends from the western shores of the Gulf of Mexico almost to the Azores. During August and September, however, which constitute the middle months of the hurricane season, the region of the West Indies is peculiarly liable to disturbances, more especially the Caribbean Sea, where some of the most disastrous storms on record have reached their maximum intensity. To protect our vast shipping interests in these waters and to warn our southern coasts when a hurricane threatens, is one of the most imperative duties of the Weather Bureau.

Nine stations in all have been established; one at Havana and one at San Juan being open the year around. Three others in Cuba and one each in Santo Domingo, St. Kitts, the Barbadoes and Curacao are open from July to November. These stations are in charge of trained officials sent out from the United States; but regular reports are also received from special local agents at various points, as well as from the captains of vessels, while official exchanges are made with the British stations at Jamaica and elsewhere.

From the information thus collected a most comprehensive view of the whole hurricane region is gained and the slightest disturbance noted. Should a dangerous storm be feared, the central bureau demands constant observation from the affected area, and by notifying the other stations of the danger, the whole service is put in readiness for instant action. Thus within a few minutes after the receipt of a warning message from San Juan, every station from Havana to the Barbadoes can be notified and placed not only in the closest touch with the Washington bureau, but each with the other. Such a system is unequaled the world over and calls forth the highest praise from the masters of foreign vessels, which, of course, share the benefits equally with American shipping.—*The World To-Day.*

THE WANING GLORY OF NIAGARA

Those who wish to see Niagara Falls in anything like their primitive

beauty and grandeur must not delay their visit very long. The hydraulic plants already in operation, when in full head, divert 48,800 cubic feet per second from the Niagara River above the falls, or 29% of its minimum flow. When all the works now operating or under construction are carried out to their full authorized capacity, the water withdrawn will be 67,406 cubic feet per second, or 41% of the minimum discharge rate of Niagara River.

These are the figures given by Mr. Alton D. Adams, in the current number of *Cassier's,* an engineering magazine. They are an engineer's exact calculation. When these plants are at work the volume of water going over the falls will be less by two-fifths than it was five years ago, and the spoliation has only begun. New York makes concessions to power companies to take Niagara River water in competition with the Province of Ontario, giving concessions on the Canadian side. The only way to stop this is by international agreement between the American and British Governments, but the New York Legislature has recently rejected a proposition to ask for this intervention.

Forty-one per cent. of the Niagara water having been given away in this way, it is not to be presumed that the remaining 59% will be held sacred. Before the plants now constructing are finished there will be fresh applications for power privileges from both sides of the river, and, judging by the past, they will be granted almost as soon as they are requested by parties who know how to interest Legislatures in their schemes. The very natural conclusion of Mr. Adams is that:

"Niagara Falls are doomed. Children already born may yet walk dryshod from the mainland of the New York State Reservation to Goat Island across the present bed of the Niagara River."

From his statement of fact and calculation he clearly postpones the day of doom too long. When the plants now constructing are all in full operation and two-fifths of the Niagara water are withdrawn from the river the relatively shallow channel that leads to the American fall will be dry and men of the present generation well advanced in age will not be too old to walk dryshod to Goat Island "across the present bed of the Niagara River." Let us hope that the Canadian fall may last a generation longer, but even of this there is no assurance.

There are some who will not regret this destruction of Niagara. They regard the conversion of its force into electric power as more than a fair equivalent for the destruction of the beauty and grandeur of the falls. But Niagara of right belongs to the millions who view it with fascination and never-tiring delight. The power that its current is being converted into

belongs to a comparatively few private individuals, who use it for their personal gain.

If Niagara was the only point capable of furnishing electric power there would be some excuse for its spoliation, but this country is rich in water power now going to waste. It may not be in such a convenient and concentrated form as at Niagara, but it is available. Still, if the people of this country remain supine and make no commanding protest it will require a very few years to convert the glory and the grandeur that were Niagara Falls' into horse-power and volts.

ACCURACY OF WEATHER FORECASTS IN NORFOLK, VA.

The most varied weather in our country is found along the Atlantic coast. Hence it is in this section that the greatest chances for error are to be expected in making official forecasts of the weather.

The following report for eight months in 1904-1905 of the success of weather forecasts at Hampton, Va., shows that the degree of accuracy is very great and that the accuracy is much greater in winter when the weather changes are more contrasted than in summer when the weather is more uniform, and the changes are very slight from day to day:

	July	*Aug.*	*Sept.*	*Oct.*
No. of forecasts received from Washington.....	26	27	25	26
" " " correct	15	16	17	18
" " " partly correct	8	9	7	8
" " " wrong	2	2	1	0
	Nov.	*Dec.*	*Jan.*	*Feb.*
No. of forecasts received from Washington.....	25	26	24	23
" " " correct	15	21	20	18
" " " partly correct	9	4	1	3
" " " wrong	1	1	3	2

NOTES

ESTIMATING DISTANCES.—It is important that children should have much drill in estimating distances; it has its value not only in the study of geography, but in all the affairs of life as well. Let them be supplied with measures, foot-rules, etc., and encourage their constant use. It is not necessary to spend much, if any, money for the purpose; many merchants will freely give, for advertising purposes, excellent foot-rules, yard-sticks, etc. Or the ingenious teacher can easily make them from good cardboard. Let the pupils estimate the length of their slates, the width of their desks, the size of the school room, the length and width of the yard, and a multitude of other objects, taking care in every case to verify their estimates by careful

measurements. I think it would be easy to arouse an interest in such work that would almost amount to a passion. To get ideas of longer distances, a neighboring field, city block or familiar piece of road may be used. To pupils thus trained, it will mean something when they are told that a monument or tower is so many feet high, or that a river, road or street is so many feet wide. If they read that Denver is 5,000 feet above sea level, let them think of the piece of road a mile long set up on end to represent this height. To most students of geography, probably such statement of distances means nothing beyond the figures in which they are expressed. The height of Mt. Washington given as 60,000 feet instead of 6,000 would mean only a difference of one zero.

SOME GEOGRAPHIC DON'TS.—Don't use "up" for *north,* nor "down" for *south.* "Down" is with the pull of gravity and ends at the center of the earth. "Up" is opposite to the pull of gravity and ends at infinity. The directions *up* and *down* are parallel with the earth's radii, and, therefore, cannot be used for the cardinal directions *north* and *south.* North and south directions lie in a horizontal plane, while up and down directions lie in a vertical plane.

This confusion of terms results from the use of "wall" maps, which for the accommodation of the class are presented in a vertical plane, with this instruction: *"North* is towards the top of the map, and *south* is towards the bottom." If maps were displayed in a horizontal plane, and with respect to cardinal directions, then all surfaces of standing water would be regarded as absolutely *level,* and all plains and plateaus as approximately level, and "up" and "down" could not be used for *north* and *south,* but would be reversed for directions to and from summit and base of ridges of lands, directions for which north and south are not interchangeable.

The incorrect use of "up" and "down" has led some children to think that rivers must necessarily flow southward. The supervisor heard one child say in class, "No river flows north," and saw another child trace the St. Lawrence river to its mouth in Lake Ontario. A third child, when asked to point towards Quebec, pointed in an upward direction, endeavoring to reproduce map direction. Evidently his only idea of Quebec's location was a small black dot on the map. The expression, "up the St. Lawrence to Quebec," is not infrequently heard in the lower-grade work. That city is no more real to many beginners than the giant's house at the top of the beanstalk.

Don't confound cardinal directions with cardinal points. Cardinal points are points fixed in the horizon; cardinal directions are directions towards cardinal points, and, therefore, lead in a horizontal plane. "Level"

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is at right angles to the pull of gravity. Antipodal points are the ends of a diameter of the earth, hence are not points in the same small circle, even if these points are on opposite sides of the earth.—*American Education, March, 1905.*

Coal Resources of the United Kingdom.—Governments do not and cannot allow the needs of a remote posterity to have much influence on their actions, and the people of this country may congratulate themselves upon the discovery that no drastic steps will be necessary to eke out our coal supplies for several centuries to come. The royal commission on coal supplies has conducted its investigations with all the care and thoroughness that the magnitude and importance of the problem merit. It has received and weighed the evidence of no fewer than one hundred and twenty witnesses, most of whom were nominated by the various associations concerned in the subject-matter of the inquiry, and it is safe to say that no authority or information that could materially influence the findings of the commission was left out of consideration. In the result we have the estimate that the available quantity of coal in the "proved" coal fields of the United Kingdom is 100,914,668,167 tons, which is alone sufficient to meet our needs for three hundred years. This estimate, too, is very conservative, for it is arrived at without including the coal at depths exceeding 4,000 feet or in seams thinner than 1 foot, and it allows an unnecessarily large margin for progressive increases in consumption, while no deduction is made for progressive economies. On the same generous basis of consumption there are supplies for one hundred and thirty years—40,000 million tons—in coal fields at present unworked. Altogether, with the coal of the undersea area and at workable depths below 4,000 feet, supplies are available for nearly five hundred years. It is a blessed relief also to know that there is not the remotest prospect of even the best of the Welsh steam coal failing the market for over two hundred years, the available supplies being estimated at 3,937 million tons. The present annual output is 18 million tons, and every effort is being made by consumers to find less expensive substitutes. It is true that, as regards the coal trade as a whole, the commissioners "look forward to a time, not far distant, when the rate of increase of output will be slower, to be followed by a period of stationary output, and then to a gradual decline," but it is clear from the report that immense economies in consumption can be effected and are likely to be effected. Out of the annual home consumption, for instance, of from 143 to 168 million tons, there is a possible saving of from 40 to 60 million tons. The influences making for economy are already potent and will inevitably rob the first sign of the permanent upward movement in the price of coal of much of its significance of evil. It is well that

it is so, for after considering the claims of possible substitutes — alcohol, natural gas, oil, water power, windmill power, and peat—the commissioners are convinced that while there are sources of power which may slightly relieve the demand for coal, our only reliable source of power is coal, and that there is no substitute.—*Monthly Sum. Com. and Finance, Jan. 1905.*

Current Articles on Commerce and Industry

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Agriculture: "Helping the Farmer" (Dept. of Agri.), *Nat'l Geog. Mag.*
Canada: "Outposts of Empire" (Ill.) *World To-Day.*
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Cotton Picking Machine, *Sci. Am.,* Feb. 18.
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Everglades of Florida (Ill.), *Century.*
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Macaroni, The Mfg. of, *Comm. Bull. and N. W. Trade,* Feb. 28.
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Mississippi Valley, Growth of Population in, *World To-Day.*
Negro's Chance (Ill.), *Sat. Evening Post,* Feb. 11.
Niagara, Opening of the Canadian Power Co. Plant, *Sci. Am.,* Feb. 4, 11.
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Panama Canal and Its Problems, *Rev. of Revs.*
Railroads, How They Build Up the West (Ill.), *World To-Day.*
Railroad Regulation, *Sat. Evening Post,* Feb. 18, 25, March 4.
Russia, *Nat'l Geog. Mag.*
Venezuela, The Industrial and Commercial Outlook in (Ill.), *Rev. of Revs.*
"Welfare Work"; Some Principles and Developments of (Ill.), *Bookkeeper.*

E. D. J.

Log Houses, Sod Houses and Adobe Houses.—Mr. W. D. Johnson describes an interesting adaptation of building material to climatic conditions. On the plains in the West, which have ample rainfall, the stream bottoms are timbered and thus furnish lumber and logs for the houses of the settlers. Further west is the sub-humid belt, where the rainfall is

too scanty for most crops and the streams are not plentiful. There is consequently little timber, but the ground is covered with a thick, tenacious sod which gives the region the name of the "short grass country." Here the sod is cut and built to a thickness of two feet or more, and makes a durable, comfortable dwelling. The roof is supported by beams which are covered with shingles when they are to be had, but often with sod, which remains green during the summer and often flowers are grown on the roof. Still further west in the arid belt the sod is not continuous and the grass grows in tufts, giving the belt the name of the "bunch grass country." Here, in absence of either sod or timber, the houses are largely built of "adobe," or sun dried mud. Mr. Johnson's paper is a part of the United States Geological Survey's report for 1900-01, Part IV., and is entitled "The High Plains and Their Utilization." Besides the problems of irrigation, the article contains a very readable account of the "boom" times in Kansas and Nebraska and their climatic factors. F. V. E.

Selected Reference List for Teachers

General.

Longman's Gazetteer. Longmans. The authoritative pronouncing and spelling gazetteer of the world. Contains excellent brief descriptions of all important places.

Andree's Hand Atlas. Velhagen and Klasing, Leipzig. Recent reference atlas containing excellent climatic maps and maps showing distribution of peoples, religions, plants, animals, etc.

Stieler's Hand Atlas. Perthes, Gotha. The leading reference atlas.

Mill, *International Geography.* Appleton. The best single volume reference book on general and regional geography.

Stanford's Compendia (Reissue). Stanford. The leading reference books on the several continents. Two volumes each on Asia, Australia, North America, Central and South America, Africa and Europe.

Mill, *Hints to Teachers and Students on the Choice of Geographical Books for Reference and Reading.* Longmans. A very helpful reference list with brief comments on the individual references. Gives general and special references.

The Teaching of Geography.

Geikie, *The Teaching of Geography.* Macmillan. A very suggestive book on the essentials of good geography teaching.

McMurry, *Special Method in Geography.* Macmillan. Discusses the scope of geography and outlines a course emphasizing the teaching by types.

Redway, *New Basis of Geography.* Macmillan. Interesting and

helpful for teachers in upper grades who need to teach continents from the practical standpoint.

Dodge and Kirchwey, *Course in Geography in the Horace Mann School.* Teachers College Record, March, 1901. A detailed outline of elementary and secondary course in geography in Horace Mann School, Teachers College, Columbia University.

Physical Geography.

Mill, *Realm of Nature.* Scribners. A very valuable and simple book on physical and mathematical geography and on biogeography.

Davis, *Physical Geography.* Ginn & Co. An authoritative secondary school text, particularly helpful in reference to the land features.

Davis, *Elementary Meteorology.* Ginn & Co. The leading English book on weather and climate.

Ward, *Practical Exercises in Elementary Meteorology.* Ginn & Co. Very helpful to teachers who have to deal with weather phenomena.

Gilbert & Brigham, *Introduction to Physical Geography.* Appleton. An interesting, authoritative and well illustrated secondary text on physical geography.

Harrington, Mark W., *About the Weather.* Appleton. Very helpful for teachers in elementary grades.

Dodge, *Reader in Physical Geography for Beginners.* Longmans. Small volume on physical geography, available as an introduction to the subject.

Biogeography.

Ratzel, *History of Mankind* (3 vols.). Macmillan. A very comprehensive book on the races of mankind, the first volume being particularly valuable for its consideration of the problems of race distribution.

Wallace, *Island Life.* Macmillan. Classic book on animal distribution from geographic standpoint.

Guyot, *Earth and Man.* Scribners. One of the older books, and hence not written from a modern standpoint; but still invaluable for presenting the relation of earth features to life.

Herbertson, *Man and His Work.* A. and C. Black. A very usable and interesting small volume, showing the manner of life of people living in different vegetation regions and amid different surface conditions.

Lyddeker, Hutchinson & Gregory, *Living Races of Mankind.* Hutchinson & Co. Two splendidly illustrated volumes on the races of men, simple, and popularly written.

Adams, *Commercial Geography.* Appleton. An accurate, well ordered and almost indispensable book on commercial geography. Maps and diagrams are very numerous and helpful for the teacher.

RIVERS BEARING "SLUDGE."—Baron Nordenskiold, in the *Geographical Journal* for May, 1903, p. 523, describes some interesting river deposits in the west part of the Gran Chaco, near Tarija, Bolivia. Here the rivers seem to issue from the mountains into the Chaco in a dry thicket on a ground of dust, a country as amiable to the traveler as the Australian Scrub. Of the rivers only the Bermejo and Pilcomayo get to the Paraguay, the rest losing themselves in the ground. "Close to the mountains they deposit stones and gravel, and simply carry fine silt out into the Chaco. A river like the Pilcomayo has no determined course, but in the Chaco divides and distributes itself in swamps at random. During the rainy period these rivers, having an abundance of water, deposit vast masses of sludge; during the dry season, the quantity of water being greatly reduced, the sludge deposited by the river turns into dust, which, blown about by the wind, is spread far and wide. The loose soil of the Chaco seems to me, as previously stated, to be formed of sludge deposited by the rivers and afterwards transported by the wind. It is scarcely probable that sediments carried through the air from distant parts should form any considerable portion of these deposits. Sections made through the earth strata of the Chaco prove it to be loose, characteristic, unsifted, porous dust, full of the shells of numerous land molluscs.

In order to comprehend how enormous masses of sludge can be carried along by the rivers, we must duly consider the rainfall. Whereas, in the north of Europe, it is only during spring that the streams transport any large mass of solid material, the rivers of South America are thick with sludge during the entire period of the rainy season. Storms are also far more violent in these regions than in the north of Europe. On the route from Quinta to Salta, the Rio San Francisco is crossed. I have traversed it when there was but little water; this same river, however, annually claims some victims among those who ford it at flood-tide.

A rider, wishing to cross the river after rain, perished in the attempt, and all that was ever found of horse, rider, or saddle was a saddle-bag, everything else had completely vanished. The great difference in elevation also favors this accumulation of silt in the Chaco. The rivers come from a height of several thousand feet, with an exceedingly abrupt fall into the Chaco, where the further flow has a very slight descent."

The same number of the *Journal* at p. 558 reports similar phenomena at the headwaters of the Musa river in British New Guinea. "Many of the streams flowed with a thick milky looking water, while in traversing their wide flood channels the traveler sometimes sinks to the knees in a kind of pipeclay slush. These strange waterways are attributed to landslips in the Goropu range, which hold back the water until it at last bursts forth carrying devastation in its train." M. S. W. J.